Karan Chawla

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Technical Summary

Highlights Extensive robotics software development on autonomous systems, including implementation of low-level control in **C++** on embedded systems, navigation using **ROS/C++** and, visual odometry and classification using **TensorFlow/OpenCV**.

Languages Python, C, C++, Bash, TEX

Libraries & Packages NumPy, TensorFlow, Matplotlib, scikit-learn, OpenCV, ROS Navigation Stack

Software MATLAB, Simulink, *git*, SolidWorks, Ansys

Operating Systems & Middleware Linux (Ubuntu), ROS (Indigo & Kinetic)

Hardware mbed LPC1768, Odroid XU4, Beaglebone Black, AutoQuad 6, Xbee, CrazyFlie 2.0

Education and Academic Experience

Aerospace Engineering, Master of Science(3.89)
University of Illinois at Urbana-Champaign
2016 – *expected* 2017
Urbana, IL

Relevant Coursework *Reinforcement Learning*, *Introduction to Robotics*, *Autonomous Decision Making*, *Control System Theory & Design*, and *Robot Dynamics & Control*

Research Working with Prof. Girish Chowdhary on end to end mapless navigation using *Reinforcement Learning*.

Teaching Assistant
Spring 2017

- Aerospace Experimental Methods

Mechanical Engineering, Bachelor of Engineering(8.7)
BITS Pilani
2012 – 2016
Goa, India

Relevant Coursework *Numerical Methods*, *Advanced Dynamics*, *Data Structures and Algorithms*, and *Introduction to Computer Programming*

Research Worked under Prof. Shibu Clement on Search and Rescue UAVs, Prof. Joel George on tilt-rotor design and control and Prof. Ranjith Mohan on vision based servo keeping of quadrotors.

Abroad Worked at the National University of Singapore in Singapore on Morphing Wings and Annular Wing Design, CFD analyses of annular wing using **HPC** and **STARCCM+** and Wind Tunnel Testing. (Jan - Jul 2012)

Internships

Robotics Software Engineer
FarmWise Inc.
May 2017 – Aug 2017

- Developed Gazebo-ROS simulation environment along with teleoperation, lane following and way-point navigation with timed-elastic-band optimization scheme for precision farming robot.
- Used DeepLearning architectures as feature extractors for unsupervised classification of crops and weeds.

Autonomy Research Intern
IIT Madras
May 2015 – Jul 2015

- Developed a 12DOF model of VTOL Tiltrotor aircraft in MATLAB.
- Utilized cascaded PID control, decoupling transformation and position control techniques to control the aircraft in hover, transition and cruise modes and tested model in Simulink.

Mechanical Design Intern
Vuyoo Inc.
May 2015 – Aug 2015

- Designed a waterproof drone capable of autonomously following surfers with 30 minute flight time and AUW of 1.6kg.
- Was responsible for directly dealing with vendors to ensure cost $\leq$ \$1200 while ensuring drone is waterproof and aesthetically pleasing.

Leadership Positions

Robotics Software Engineer
IRIS
2017 – current

- Developing software for autonomous mining on Mars.
- Implemented visual inertial odometry for Ackermann steered rover using ROS/C++

Coordinator Aerodynamics Club
2013 – 2015

- Conducted workshops on RC aircraft design and flying.
- Organized lectures on introductory aerodynamics, control systems and aircraft design.